

# Climate change-cultural heritage?

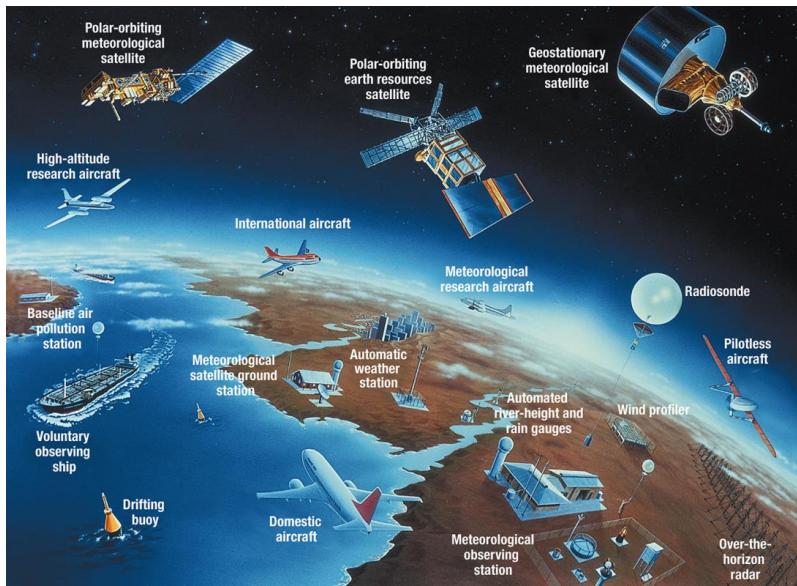
Prof. Petteri Taalas  
Secretary-General



**WMO OMM**

World Meteorological Organization  
Organisation météorologique mondiale

# World Meteorological Organization



- UN Specialized Agency on weather, climate & water
- 193 Members, HQ in Geneva
- 2<sup>nd</sup> oldest UN Agency, 1873-
- Coordinates work of > 200 000 national experts from meteorological & hydrological services, academia & private sector
- Co-Founder and host agency of IPCC (1<sup>st</sup> World Climate Conference)
- Co-Founder of UNFCCC (2<sup>nd</sup> World Climate Conference)
- WMO SG UN Climate Principal (1/3)



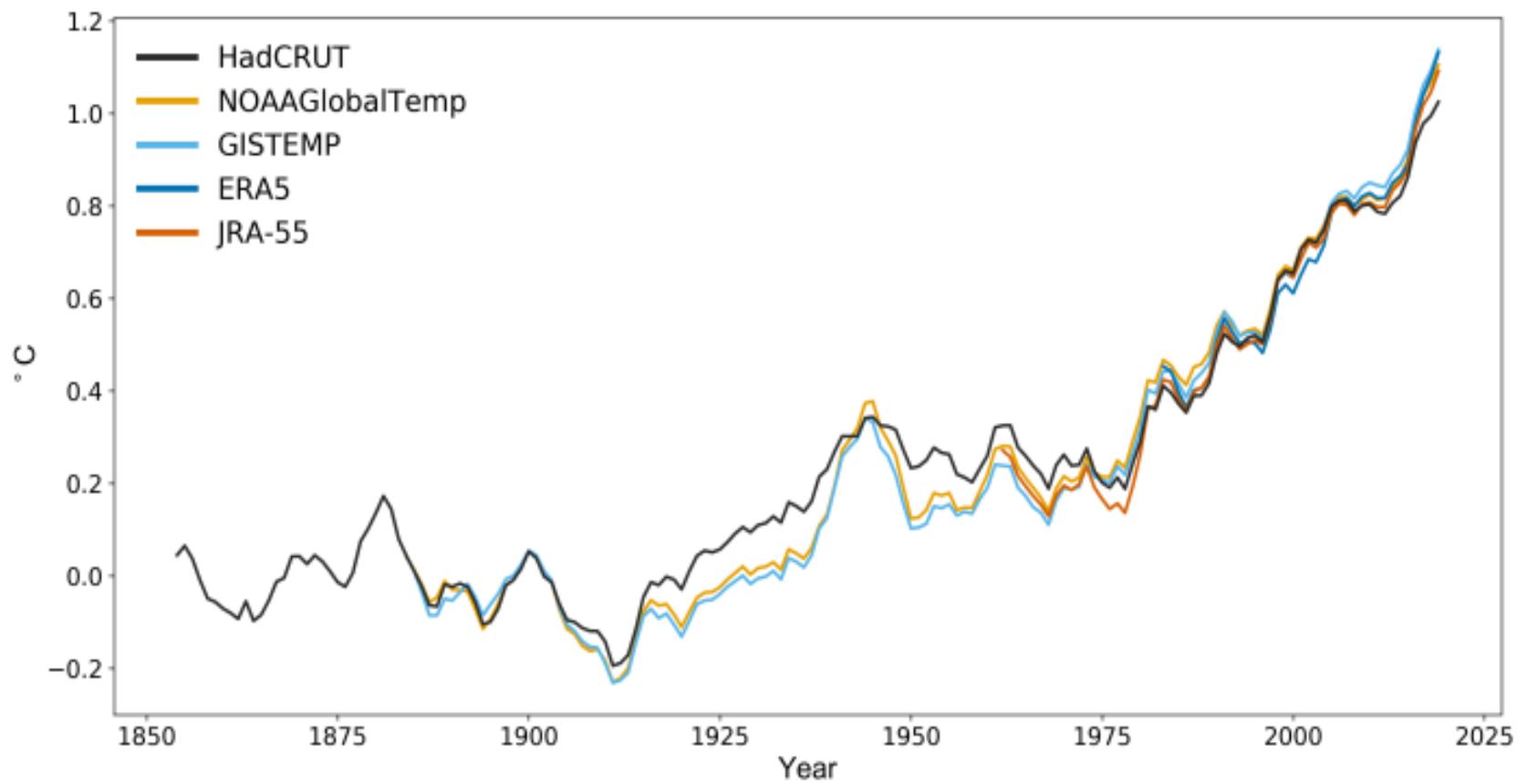
# State of climate 2019



# Global temperature 1850-2019, +1.1 °C



Global mean temperature difference from 1850-1900 ( ° C)



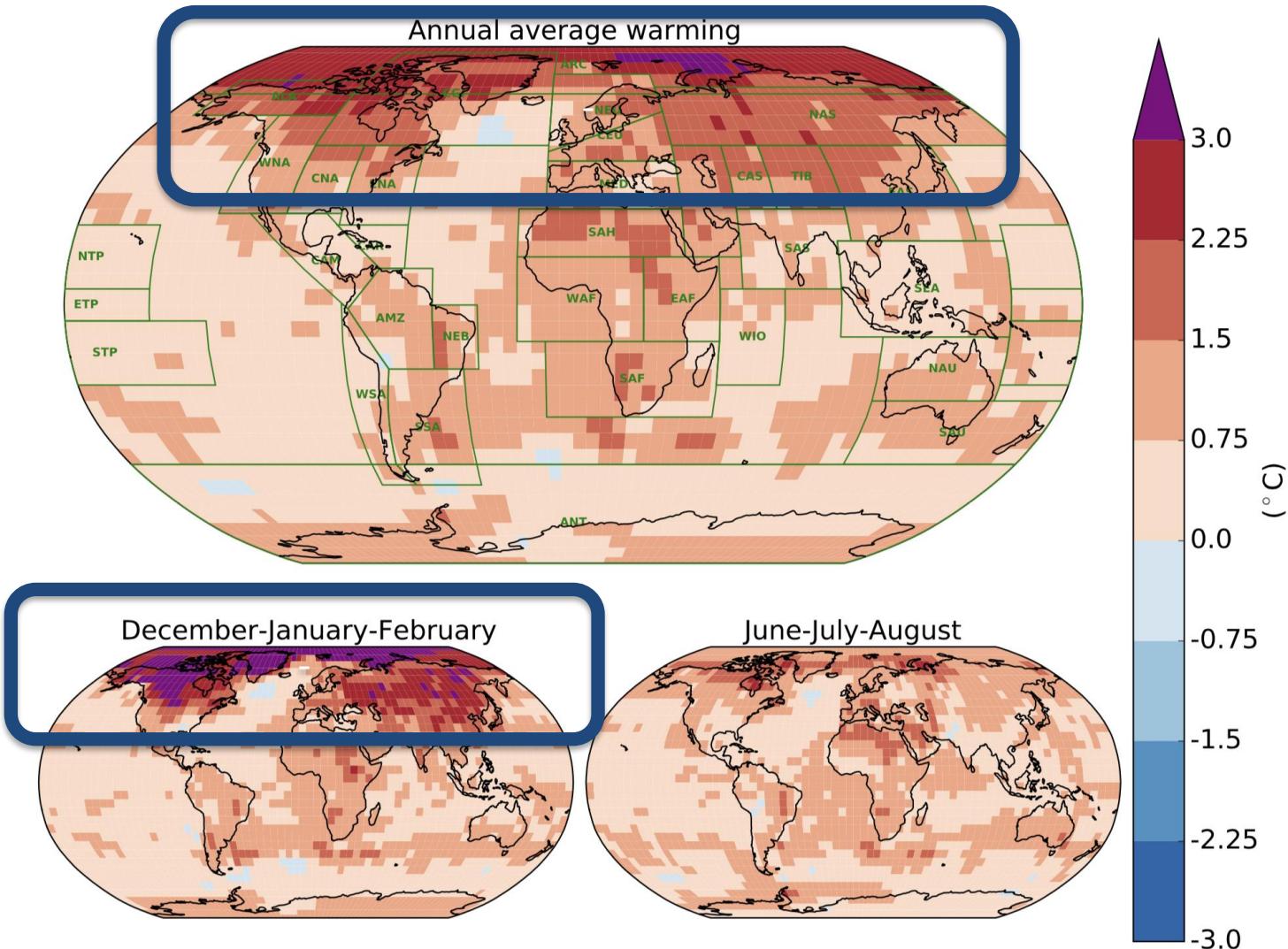
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# Warming so far

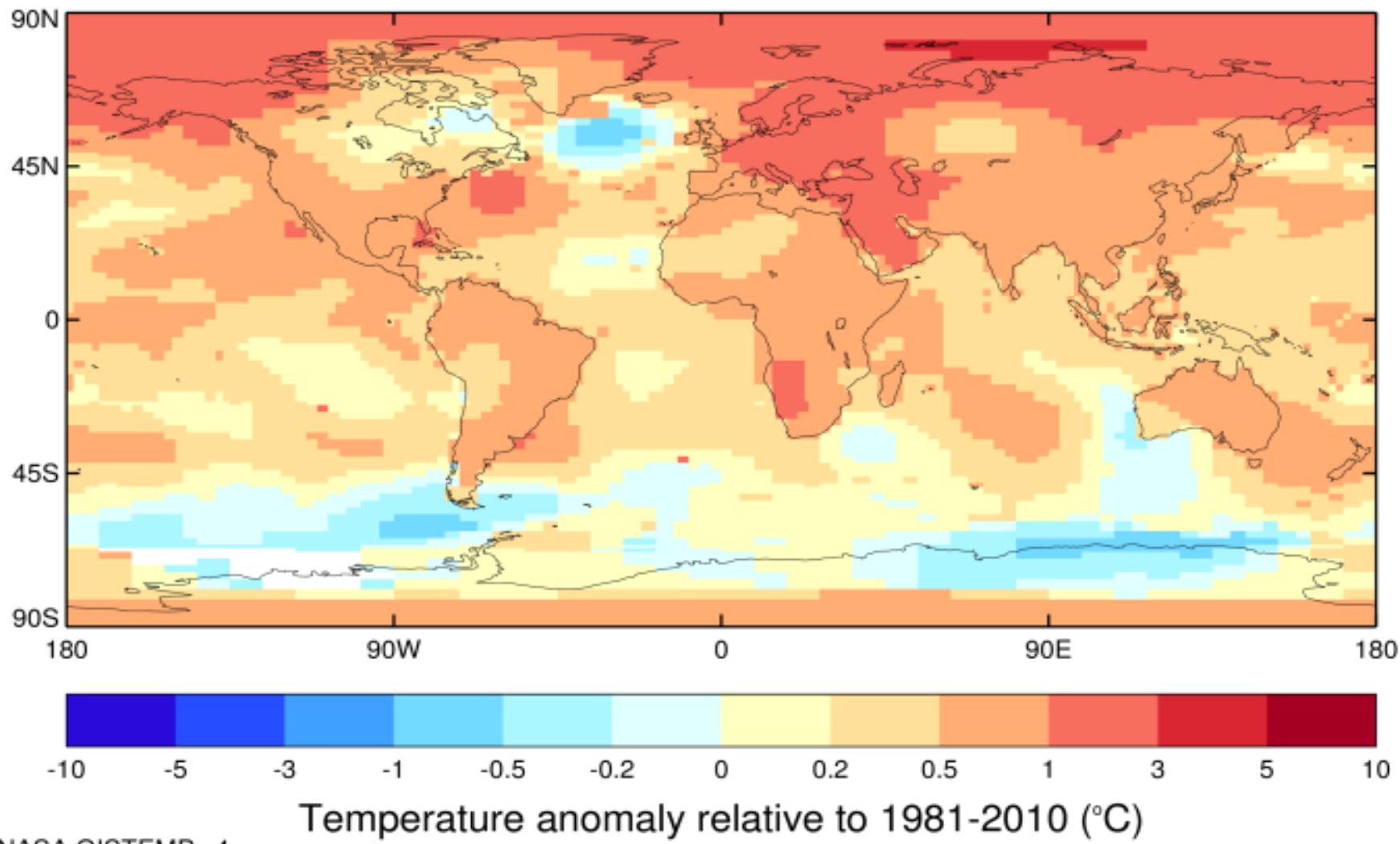
Regional warming in the decade 2006-2015 relative to preindustrial



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Source: IPCC Special Report on Global Warming of 1.5°C

# 2015-19 T deviation from 1981-2010

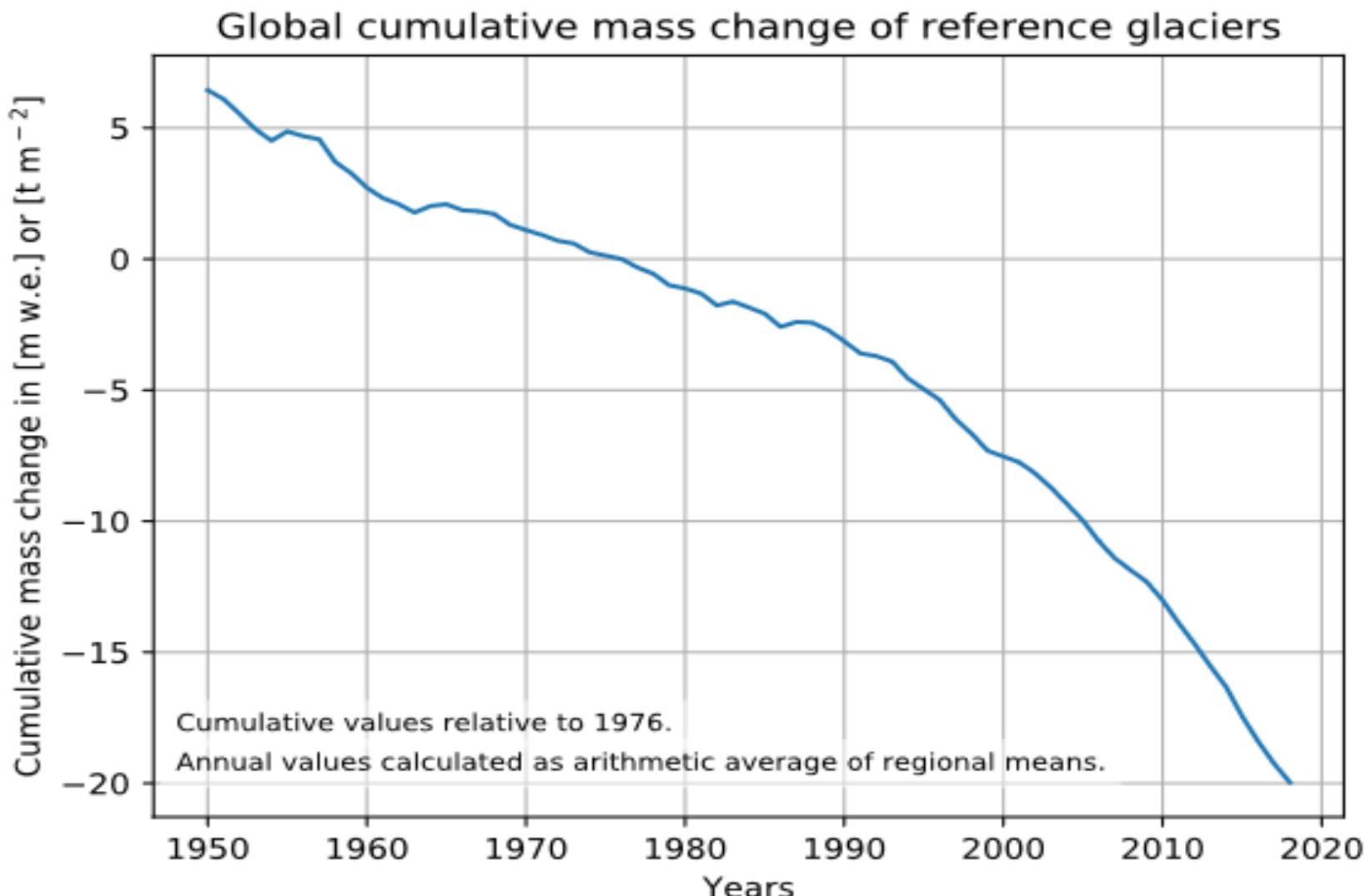


Source NASA GISTEMP v4



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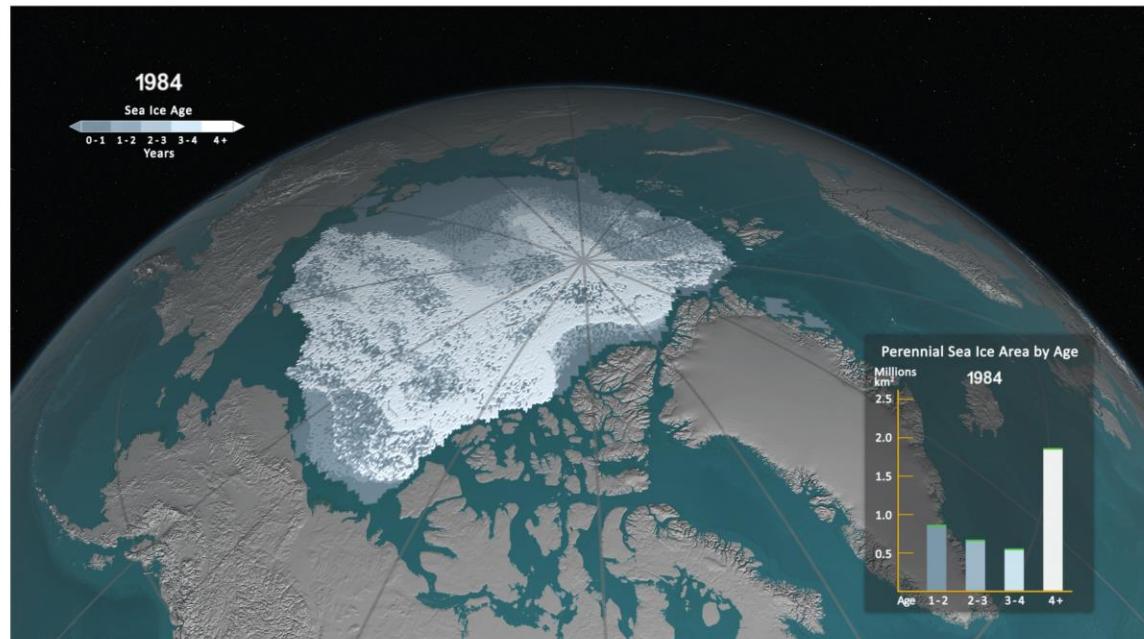
# Melting of global 31 glaciers 1950-2018



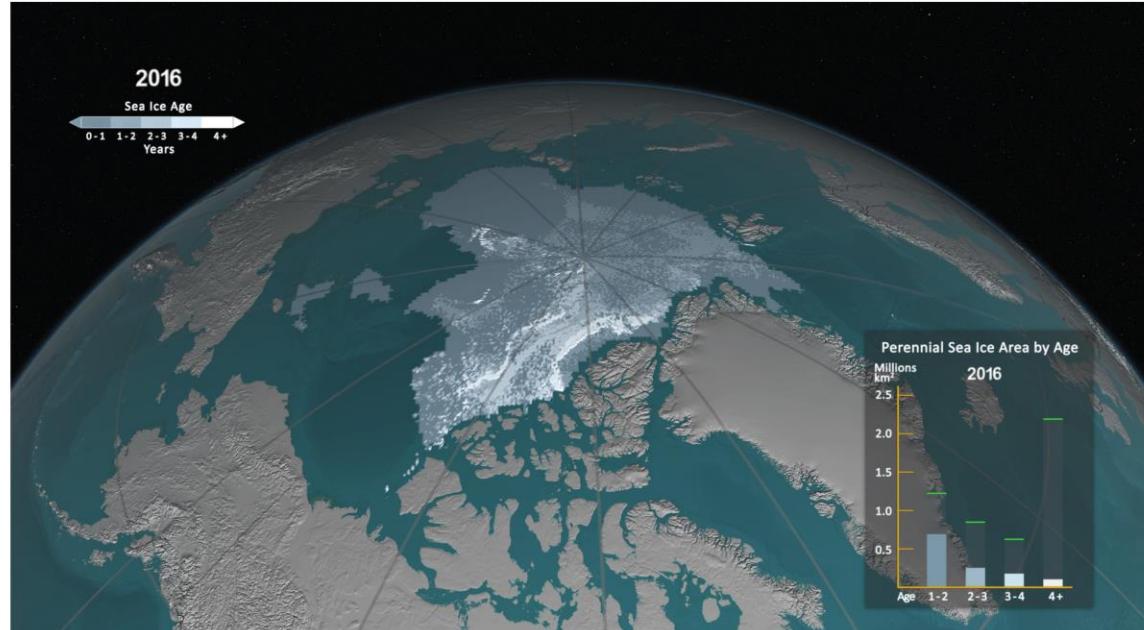
# Largest changes in the Arctic

Multi-year ice

1984

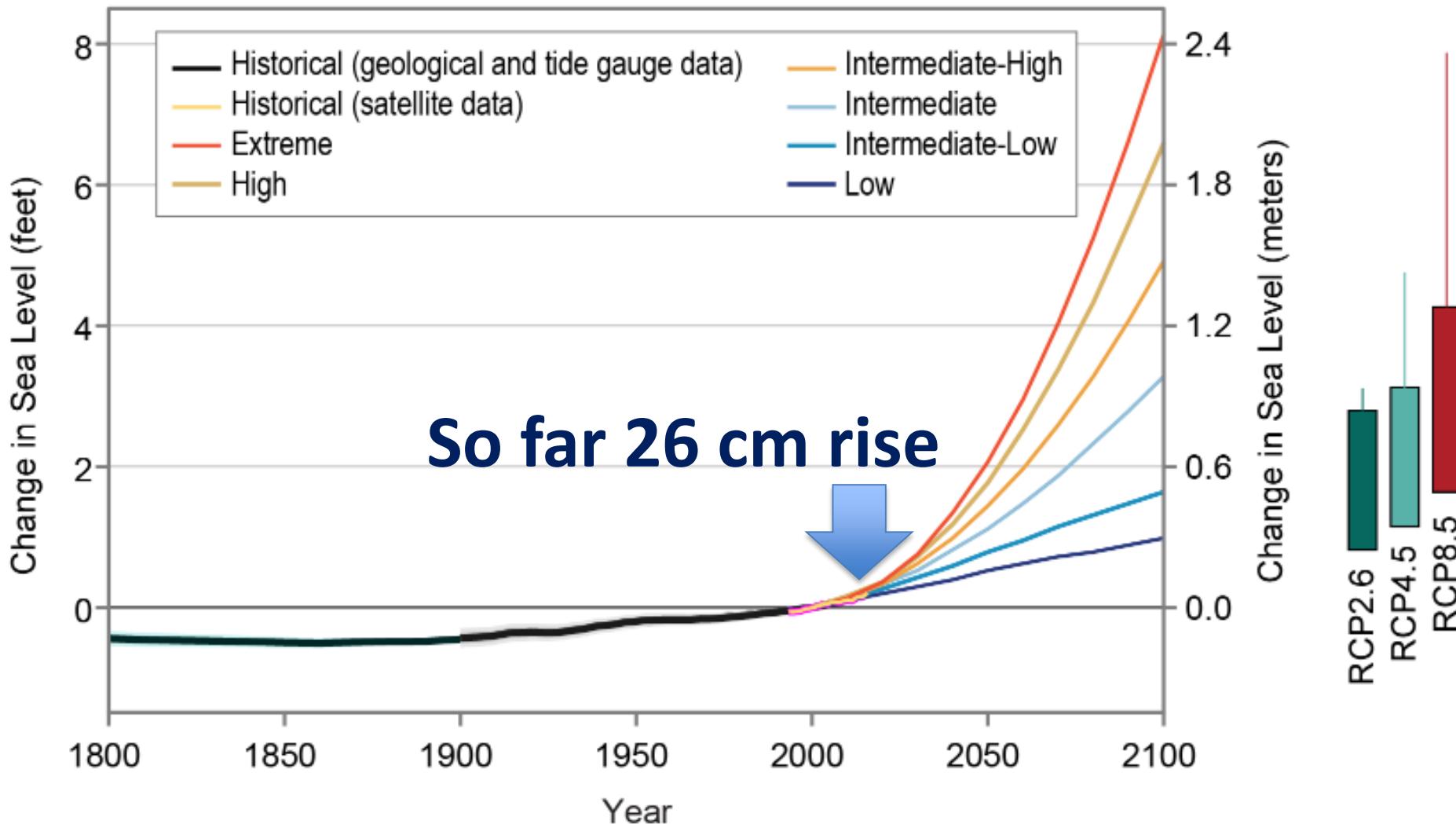


2016



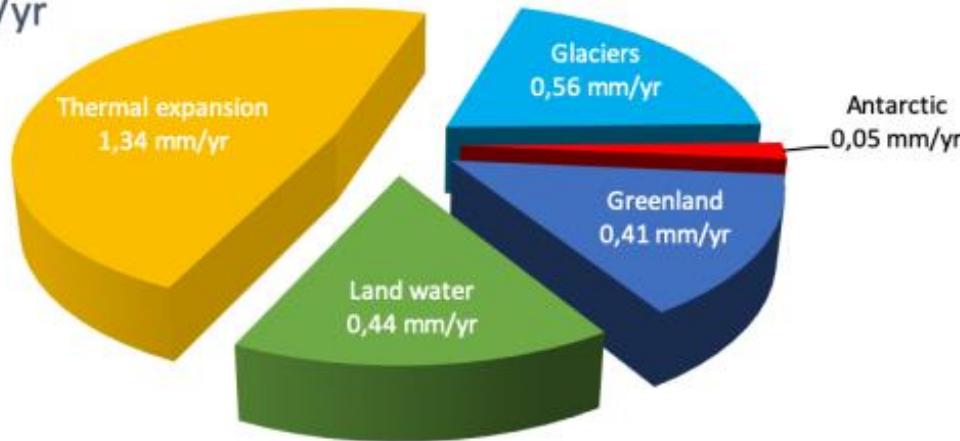
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# Emissions-sea level rise 1800-2100

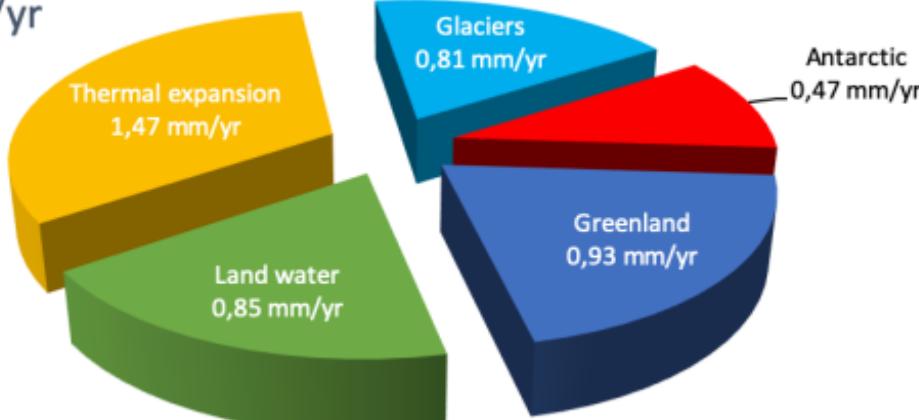


# Factors behind sea level rise

1997-2006  
Sea-level rise  
3,04 mm/yr

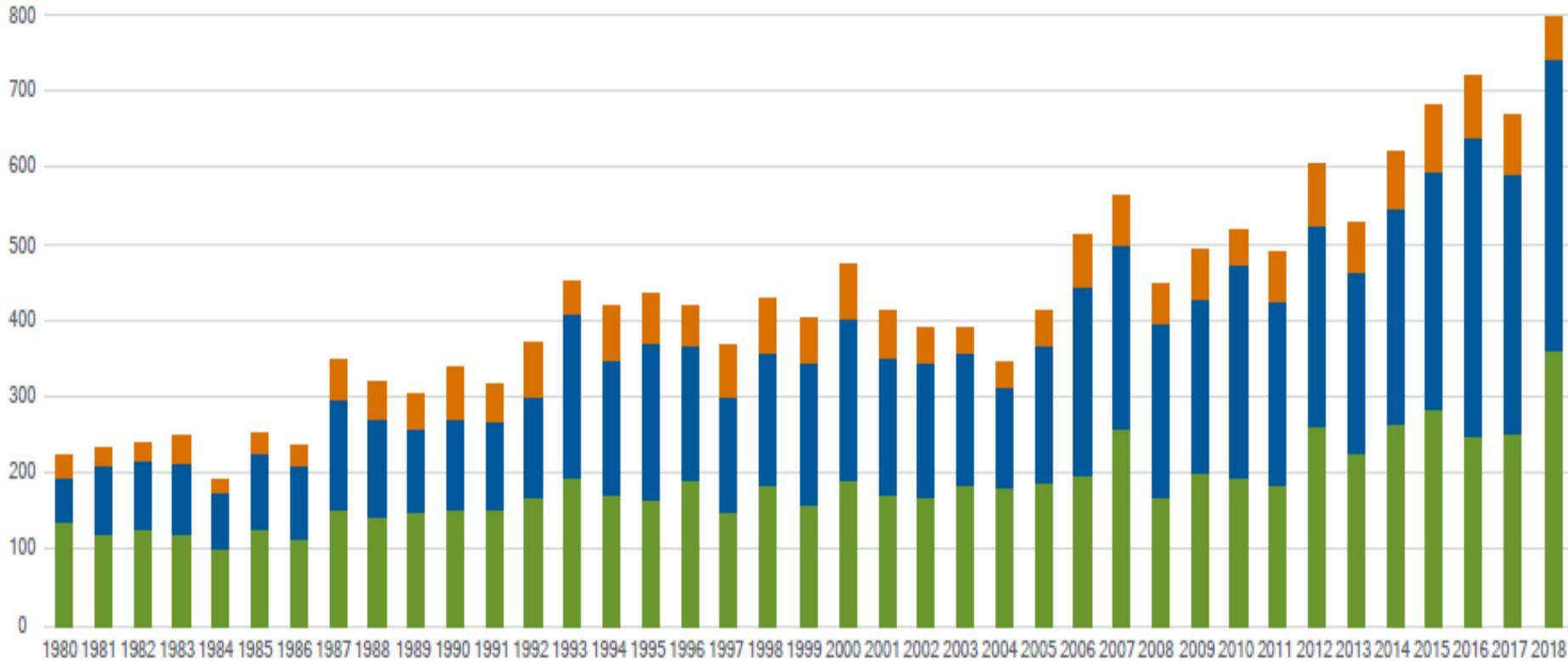


2007-2016  
Sea-level rise  
4,36 mm/yr



# Loss events worldwide 1980 – 2018

Number



● Meteorological events  
(Tropical cyclone, extratropical storm,  
convective storm, local storm)

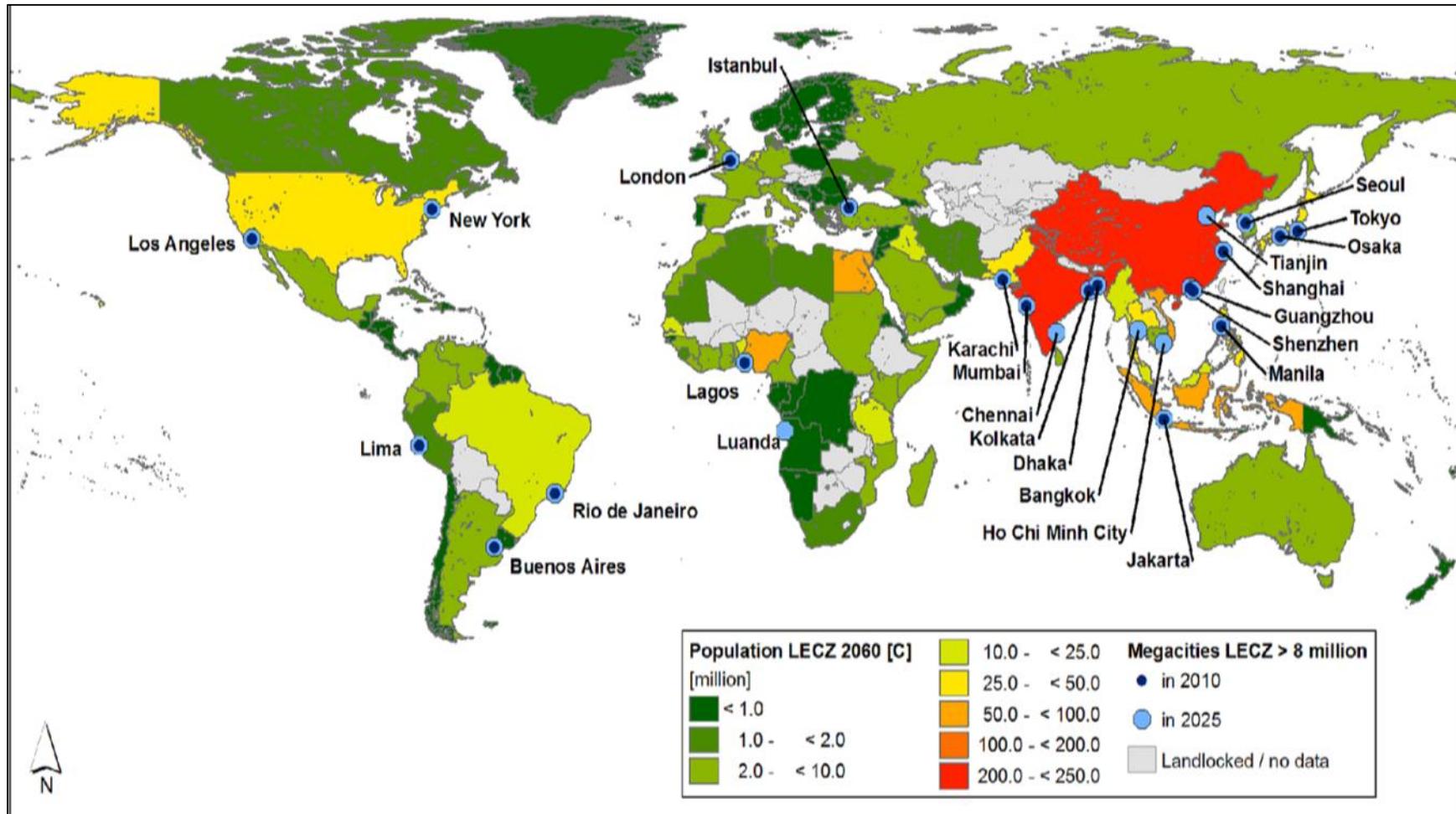
● Hydrological events  
(Flood, mass movement)

● Climatological events  
(Extreme temperature, drought, forest fire)

Accounted events have caused at least one fatality and/or produced normalised losses  $\geq$  US\$ 100k, 300k, 1m, or 3m (depending on the assigned World Bank income group of the affected country).

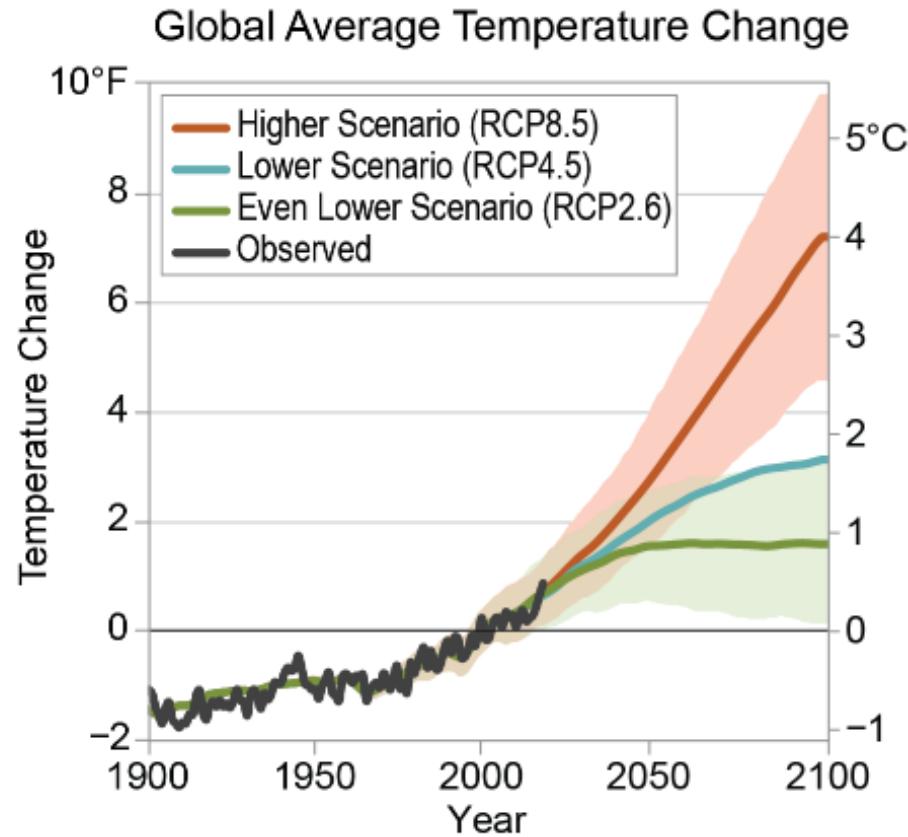
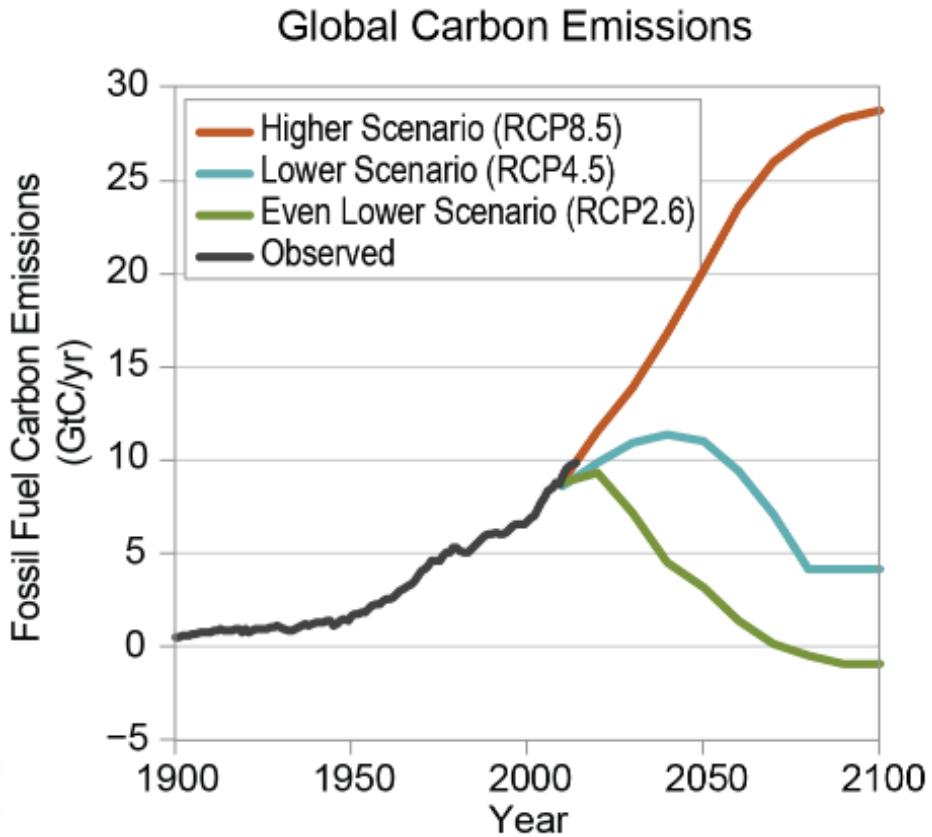
Source:  
Munich Re

# Population in low elevation coastal zones 2060 projections



Source: Neumann, Vafeidis, Zimmermann, Nicholls 2015

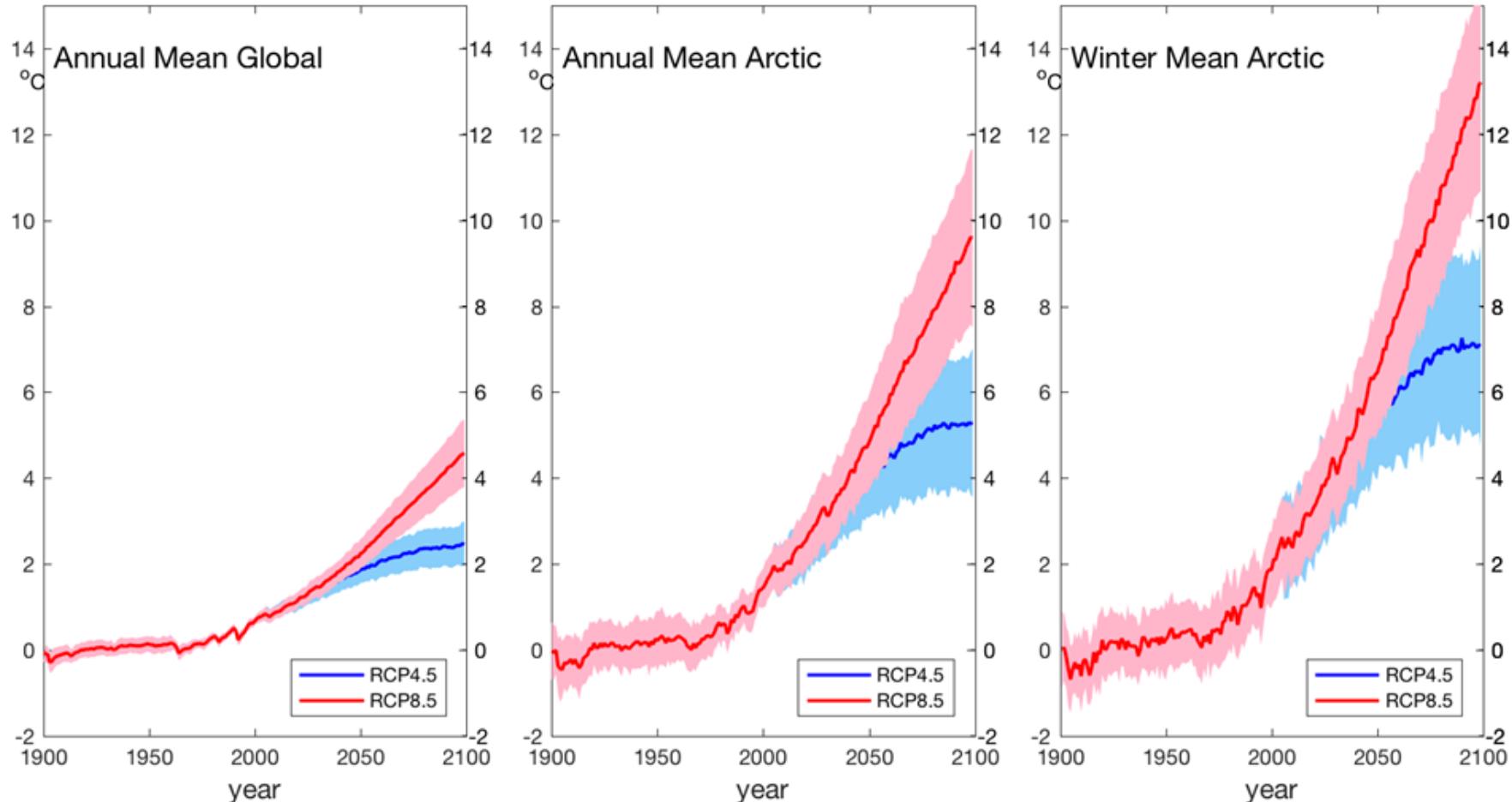
# Carbon emissions-temperature



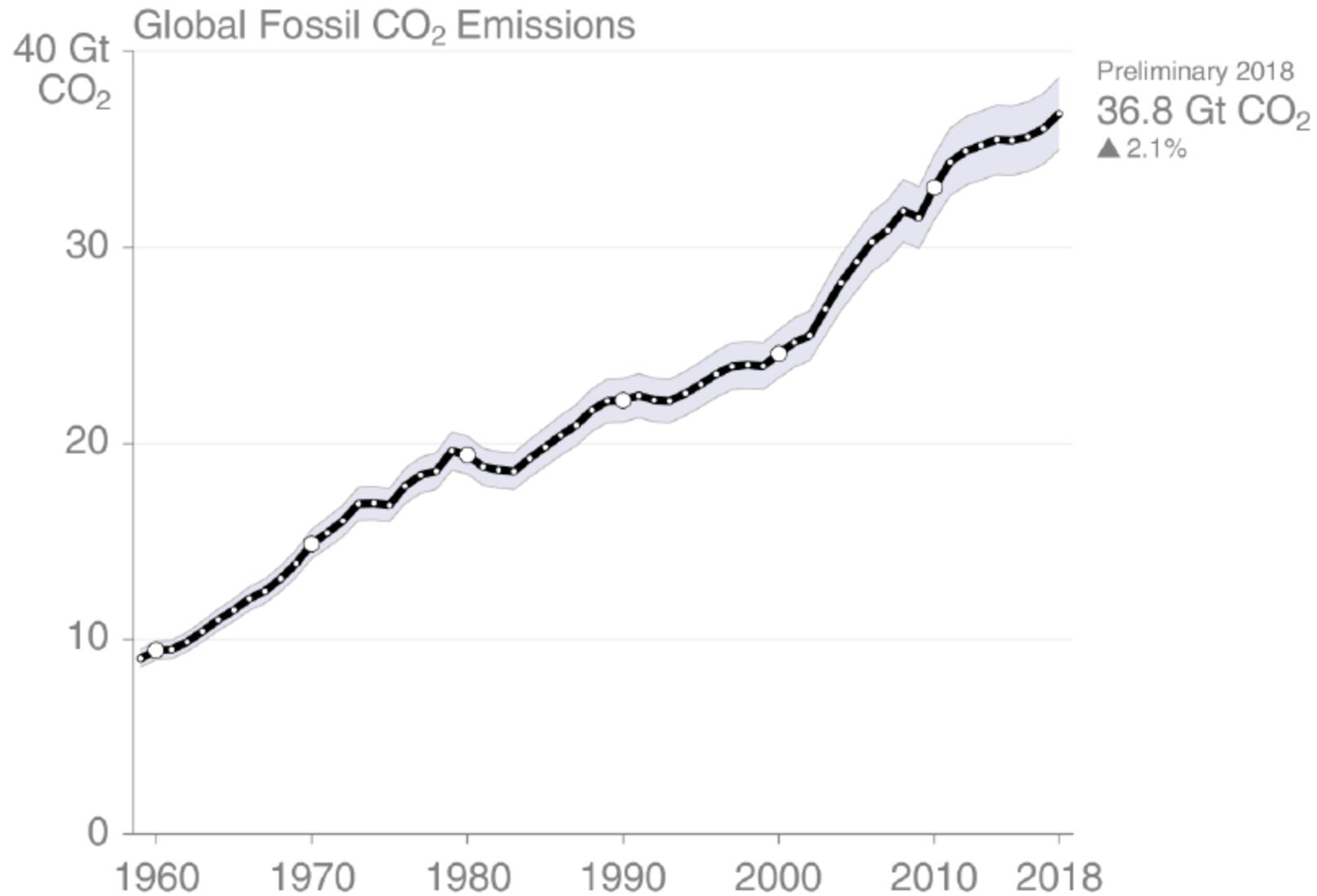
# Arctic and global temperatures 1900-2100

Averaged over 36 global climate models

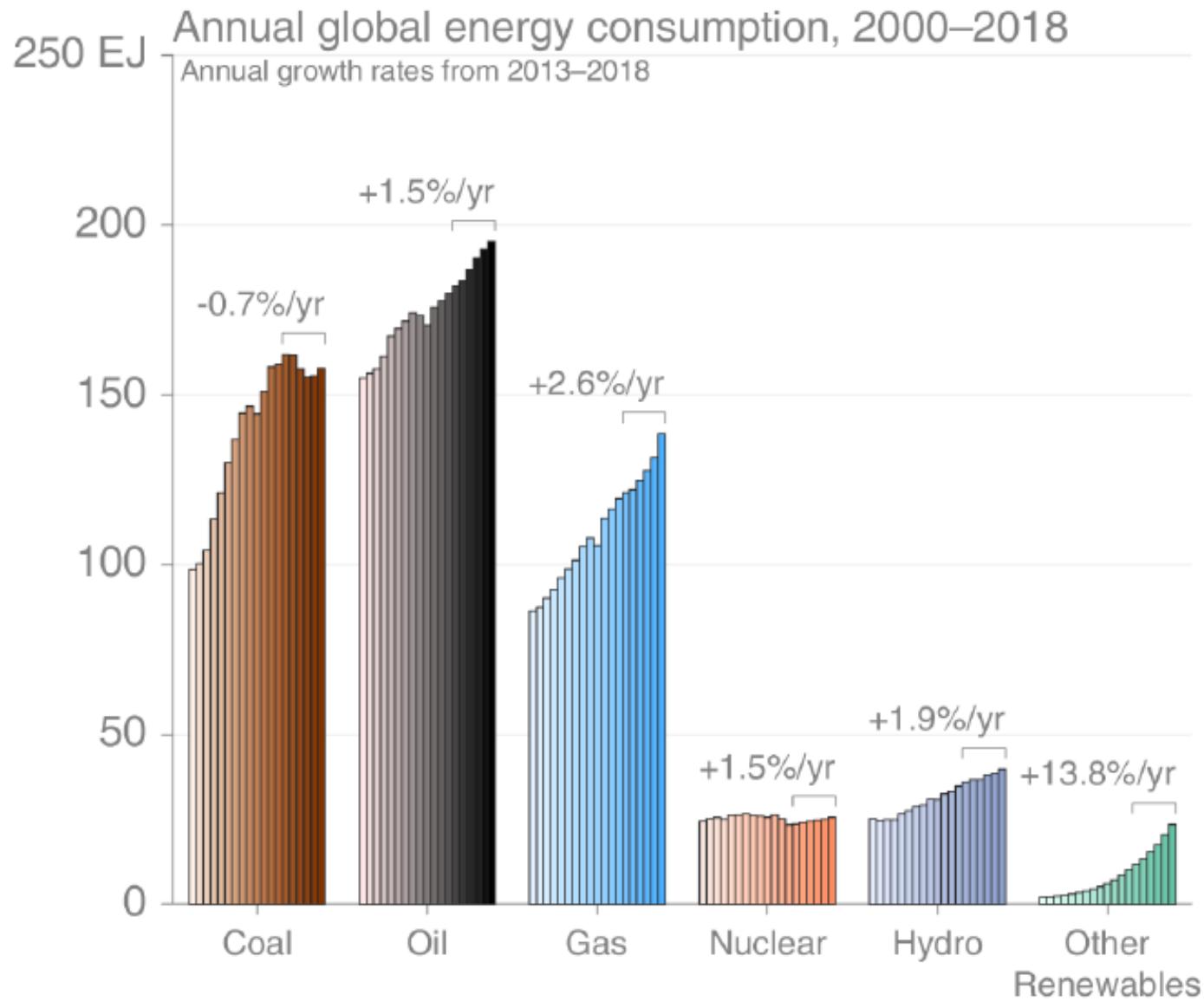
RCP 4.5 (blue)= upper end of Paris COP21 Agreement , RCP 8.5 (red)= business as usual



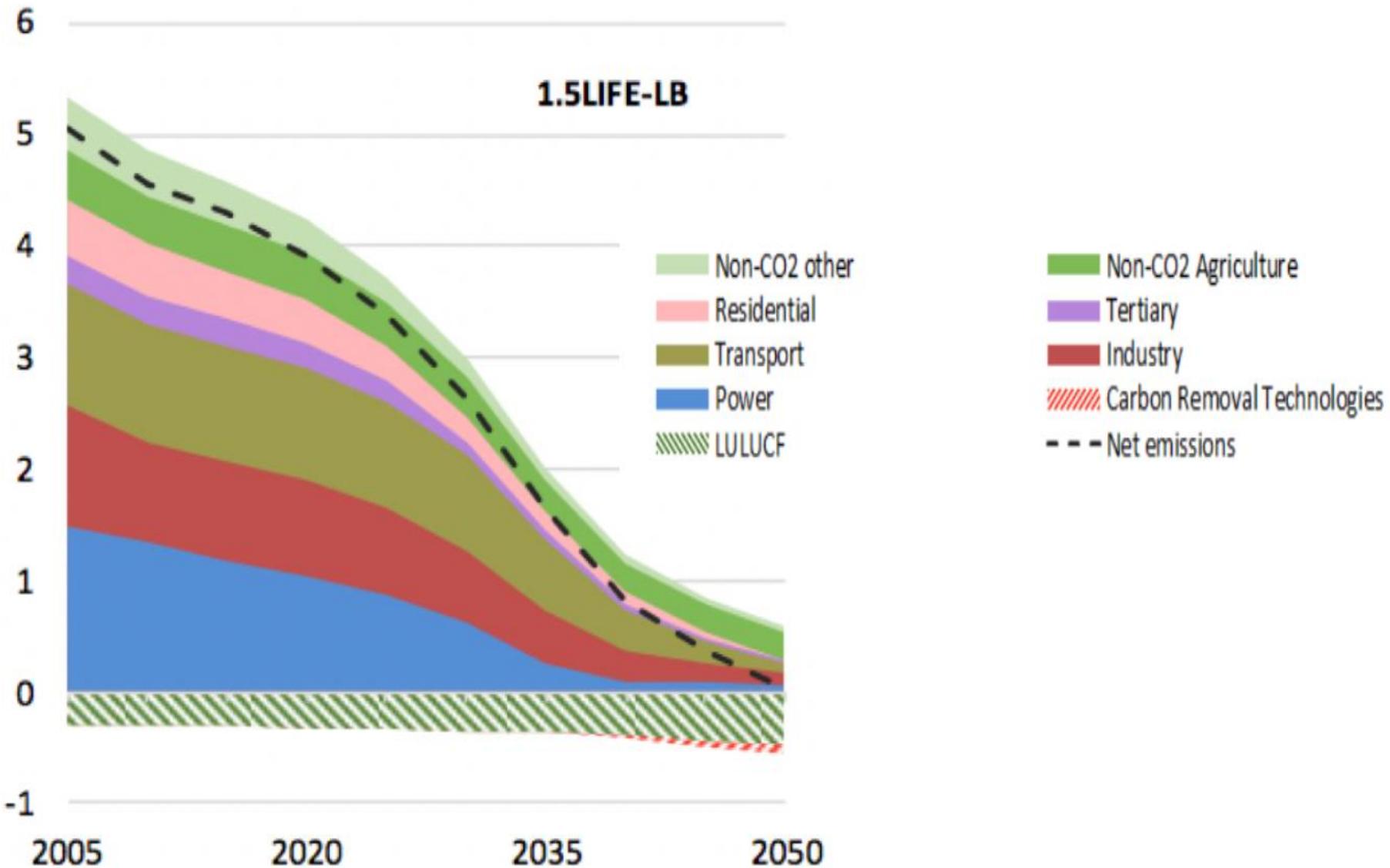
# Fossil carbon emissions 1960-2018



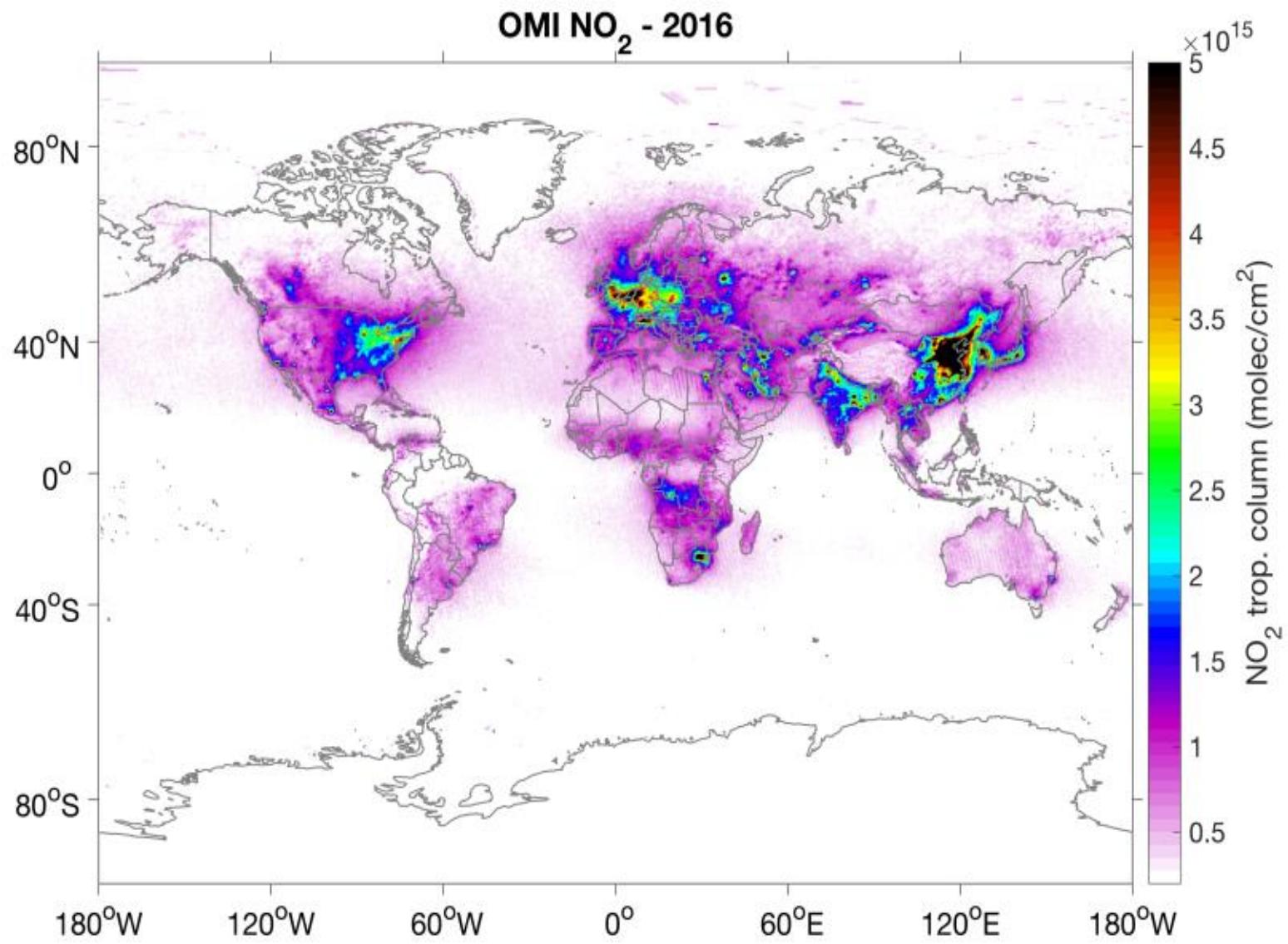
# Energy consumption 2000-2018



# How to be carbon neutral by 2050?



# Air pollutants, NO<sub>2</sub>



# Climate change dimensions of cultural heritage

- Sea level rise



- Storms, coastal inundation



- Heavy rains, flooding



- Permafrost melting



- Acid deposition





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Thank you

Gracias

Merci

Спасибо

谢谢

